

**WHAT IS CLAIMED IS:**

1. A loudspeaker, comprising:

5 an acoustical enclosure that has an internal wall that divides the enclosure into first and second subchambers, the internal wall being provided with an opening;

an electro-acoustical transducer having a vibratable speaker cone, the electro-acoustical transducer being mounted in the opening provided in the internal wall of the acoustical enclosure;

10 an internal vent provided in the internal wall of the acoustical enclosure for pneumatically coupling the first and second subchambers;

a first external vent provided in a wall of the first subchamber for pneumatically coupling the first subchamber to an exterior environment outside of the acoustical enclosure;

a second external vent provided in a wall of the second subchamber for pneumatically coupling the second subchamber to the exterior environment;

15 wherein a ratio of an acoustic mass of the internal vent to an acoustic mass of the second external vent is in a range of approximately 3/1 to 7/1.

$V_{in} : V_{ex2}$

2. The loudspeaker as set forth in Claim 1, wherein the loudspeaker is a broadband loudspeaker.

20 3. The loudspeaker as set forth in Claim 1, wherein a ratio of a first volume of the first subchamber to a second volume of the second subchamber is in a range of approximately 0.3 to 2.5.

25 4. The loudspeaker as set forth in Claim 1, wherein the speaker cone has a front surface in communication with the first subchamber, and a rear surface in communication with the second subchamber.

30 5. The loudspeaker as set forth in Claim 3, wherein the speaker cone has a front surface in communication with the first subchamber, and a rear surface in communication with the second subchamber.

## 6. A loudspeaker, comprising:

an acoustical enclosure that has an internal wall that divides the enclosure into first and second subchambers, the internal wall being provided with an opening;

5 an electro-acoustical transducer having a vibratable speaker cone, the electro-acoustical transducer being mounted in the opening provided in the internal wall of the acoustical enclosure;

an internal vent provided in the internal wall of the acoustical enclosure for pneumatically coupling the first and second subchambers;

10 a first external vent provided in a wall of the first subchamber for pneumatically coupling the first subchamber to an exterior environment outside of the acoustical enclosure;

a second external vent provided in a wall of the second subchamber for pneumatically coupling the second subchamber to the exterior environment;

15 wherein a ratio of an acoustic mass of the first external vent to an acoustic mass of the second external vent is in a range of approximately 15/1 to 30/1.

$V_{ex1} : V_{ex2}$

7. The loudspeaker as set forth in Claim 6, wherein the loudspeaker is a broadband loudspeaker.

8. The loudspeaker as set forth in Claim 6, wherein a ratio of a first volume of the first subchamber to a second volume of the second subchamber is in a range of approximately 0.3 to 2.5.

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9. The loudspeaker as set forth in Claim 6, wherein the speaker cone has a front surface in communication with the first subchamber, and a rear surface in communication with the second subchamber.

10. The loudspeaker as set forth in Claim 8, wherein the speaker cone has a front surface in communication with the first subchamber, and a rear surface in communication with the second subchamber.

30 11. A loudspeaker, comprising:

an acoustical enclosure that has an internal wall that divides the enclosure into first and second subchambers, the internal wall being provided with an opening;

an electro-acoustical transducer having a vibratable speaker cone, the electro-acoustical transducer being mounted in the opening provided in the internal wall of the acoustical enclosure;

*5 Broad front vent* ↗ a first means provided in the internal wall of the acoustical enclosure for acoustically coupling the first and second subchambers;

a second means provided in a wall of the first subchamber for acoustically coupling the first subchamber to an exterior environment outside of the acoustical enclosure;

10 a third means provided in a wall of the second subchamber for acoustically coupling the second subchamber to the exterior environment;

wherein a ratio of an acoustic mass of the first means to an acoustic mass of the third means is in a range of approximately 3/1 to 7/1.  $V_{in} : V_{ext}$

*Sub B15 = 1/2* ↘  
12. The loudspeaker as set forth in Claim 11, wherein at least one of the first means, second means, and third means comprises a passive radiating element.

13. The loudspeaker as set forth in Claim 11, wherein a ratio of a volume of the first subchamber to a volume of the second subchamber is in a range of approximately 0.3 to 2.5.

20 14. The loudspeaker as set forth in Claim 11, wherein the speaker cone has a front surface in communication with the first subchamber, and a rear surface in communication with the second subchamber.

25 15. The loudspeaker as set forth in Claim 13, wherein the speaker cone has a front surface in communication with the first subchamber, and a rear surface in communication with the second subchamber.

16. A loudspeaker, comprising:

30 an acoustical enclosure that has an internal wall that divides the enclosure into first and second subchambers, the internal wall being provided with an opening;

an electro-acoustical transducer having a vibratable speaker cone, the electro-acoustical transducer being mounted in the opening provided in the internal wall of the acoustical enclosure;

a first means provided in the internal wall of the acoustical enclosure for acoustically coupling the first and second subchambers;

5 a second means provided in a wall of the first subchamber for acoustically coupling the first subchamber to an exterior environment outside of the acoustical enclosure;

a third means provided in a wall of the second subchamber for acoustically coupling the second subchamber to the exterior environment;

10 wherein a ratio of an acoustic mass of the second means to an acoustic mass of the third means is in a range of approximately 15/1 to 30/1.

$V_{ex1} : V_{ex2}$

*Sub  
B2*  
17. The loudspeaker as set forth in Claim 16, wherein at least one of the first means, second means, and third means comprises a passive radiating element.

18. The loudspeaker as set forth in Claim 16, wherein a ratio of a volume of the first subchamber to a volume of the second subchamber is in a range of approximately 0.3 to 2.5.

19. The loudspeaker as set forth in Claim 16, wherein the speaker cone has a front surface in communication with the first subchamber, and a rear surface in communication with the second subchamber.

20. The loudspeaker as set forth in Claim 18, wherein the speaker cone has a front surface in communication with the first subchamber, and a rear surface in communication with the second subchamber.